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PLATYBELODON GRANGERI, THREE GROWTH STAGES, AND A NEW SERRIDENTINE FROM MONGOLIA[1]

BY HENRY FAIRFIELD OSBORN AND WALTER GRANGER

In addition to the type, paratype and eleven other specimens (A. M. 26200–A. M. 26212) of the 1928 collection as reported by the senior author,[2] the expedition of 1930 fortunately discovered two great quarries (Fig. 1) to the east of the Kalgan-Urga Trail which yielded an extraordinary assemblage of representatives of these species in all stages of growth from an unborn young, two juvenile stages to adults of both

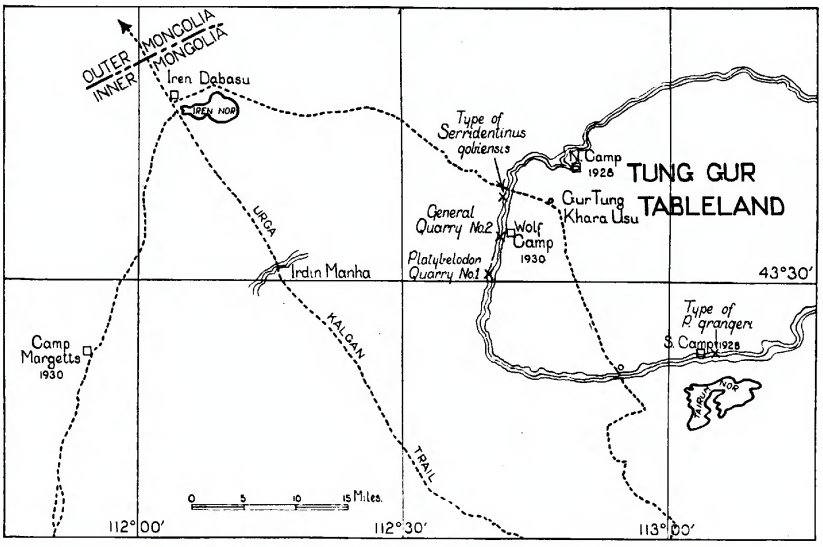

Fig. 1. Sketch map of the region around Iren Dabasu, Inner Mongolia.

The two working camps of the 1930 Central Asiatic Expedition are here shown in Wolf Camp in the Mio-Pliocene (*Platybelodon*) beds of the Tung Gur tableland and Camp Margetts to the westward in the Upper Eocene (Irdin Manha) and mid-Oligocene (Houldjin Gravels).

All specimens of *Platybelodon grangeri* have come from the Tung Gur tableland. The original discovery of this form in 1928 was at N. Camp, and the type and best preserved specimen came from S. Camp. In 1930 the specimens came mostly from two quarries along the western escarpment.

[1]Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 112.

[2]Osborn, H. F. 1931.847. The Shovel-Tuskers, Amebelodontinæ, of Central Asia. Amer. Mus. Novitates, No. 470, Apr. 10, pp. 1–12, text figs. 1–3.

sexes. Among these are the cranial and skeletal parts, mostly scattered, but fortunately one fine individual cranium and jaw (A. M. 26462) were found together, as represented in Figure 7. This unique collection enables us to amplify the original definitions and descriptions of the genus *Platybelodon* Borissiak and to extend our knowledge of the species *Platybelodon grangeri*, affording not only a complete definition of the species but greatly extended knowledge of the generic characters. Associated with these platybelodonts is a great variety of faunal associates which await generic and specific description, also a fine specimen (A. M. 26461) of a new *Serridentinus* which is here described as *Serridentinus gobiensis*, a welcome addition to the serridentine fauna of the ancient Gobi to which the species *Serridentinus florescens* was previously referred.

Platybelodon grangeri Life Zone, Tung Gur Formation of the Eastern Gobi Region

These beds, discovered in 1928 by Andrews and Spock, occur as a low peneplaned tableland more than 25 miles across. The northwestern edge of this deposit lies about 40 miles southeast from Iren Dabasu on the Kalgan-Urga Trail. Near the edge of this tableland at this point is an important well, known to all travelers in the region as Gur Tung Khara Usu. The horizon name Tung Gur was derived by reversing the first two words of this name.[1]

The Expedition used this Gur Tung Khara well for the first part of its 1928 work in the Tung Gur beds, and in 1930 camp was maintained in that vicinity throughout the Pliocene work. The beds are well exposed along the northern and western faces of the tableland and also for some distance along the southeastern face—bordering Tairum Nor, which latter place was worked in 1928 and which yielded the type jaws of *Platybelodon grangeri*. *Platybelodon* occurs throughout the exposures and is the diagnostic fossil of the Tung Gur beds. In 1928 the specimens of this genus were found more or less scattered, but in 1930 the majority of them came from two deposits or quarries which seem to have been bogholes in which the animals became mired and killed. These two quarries were quite unlike in the fauna represented in them.

Quarry 1. (10 miles south of Gur Tung Khara Usu).

Yielded about 16 pairs of lower jaws of *Platybelodon*, 5 or 6 fairly complete skulls and a great quantity of skeleton material, a complete representation of which was saved. All but two or three of these platybelodonts were adults, and there was almost nothing else in the quarry except this form.

[1]Spock, L. Erskine. 1929. Pliocene Beds of the Iren Gobi. Amer. Mus. Novitates, No. 394, Dec. 26, pp. 1–8, text figs. 1–6.

Quarry 2. (5 miles south of Gur Tung Khara Usu).

Yielded portions of at least one adult *Platybelodon* and 7 or 8 very young individuals. One of these latter (A. M. 26465) is considered in a fœtal stage and was taken out from between the two *os innominata* of an adult.

In addition to *Platybelodon*, this Tung Gur quarry yielded a great quantity of smaller forms—rhinocerids, bovids of many sorts, carnivores, rodents and horses (*Anchitherium*)—which remain to be identified.

LIST OF PROBOSCIDEAN MATERIAL FROM THE TUNG GUR BEDS IN THE 1930 COLLECTION

Platybelodon grangeri

A. M. 26460. Lower jaws (see photographs). Quarry No. 1.
A. M. 26463. Upper incisor tooth. Quarry No. 1.
A. M. —— . A series of some 15 lower jaws and several skulls, together with much skeleton material. Quarry No. 1. Unprepared and unnumbered.
A. M. 26464. Skull and lower jaws, juvenile. Quarry No. 2.
A. M. 26465. Lower jaws and maxilla, tusk with enamel tip. Fœtal young. Quarry No. 2.
A. M. —— . Lower jaws and fragmentary skulls of 7 or 8 young individuals. Quarry No. 2. Unprepared and unnumbered.
A. M. 26462. Skull and lower jaws and portion of skeleton of female. Isolated specimen.
A. M. 26466. Maxilla and lower jaws. Isolated specimen.
A. M. 26467. Lower jaws. Isolated specimen.

Serridentinus gobiensis, sp. nov.

A. M. 26461. Right ramus of lower jaws with symphysis and both tusks. Isolated specimen.

Platybelodon grangeri Osborn, 1929

The genus *Platybelodon* was described by Borissiak in 1928 from the "Middle Miocene" of the Kuban region, to the northwest of the Gobi, the genotype species being *P. danovi.* In 1928 the Central Asiatic Expedition discovered the same genus in the eastern Gobi and as we were at the time unaware of Borissiak's discovery, it was named *Amebelodon grangeri* by the senior author, being considered congeneric with the long-jawed, flat-tusked form, *Amebelodon fricki,* discovered by E. H. Barbour in Nebraska. Upon the appearance of Borissiak's paper its real affinities were recognized.

While the material of *Platybelodon* in the 1928 collection was ample for generic reference and for specific determination, that of the 1930 collection is vastly greater, and will, when the preparation is finished, give complete knowledge of the skull, jaws and skeleton. Perhaps the

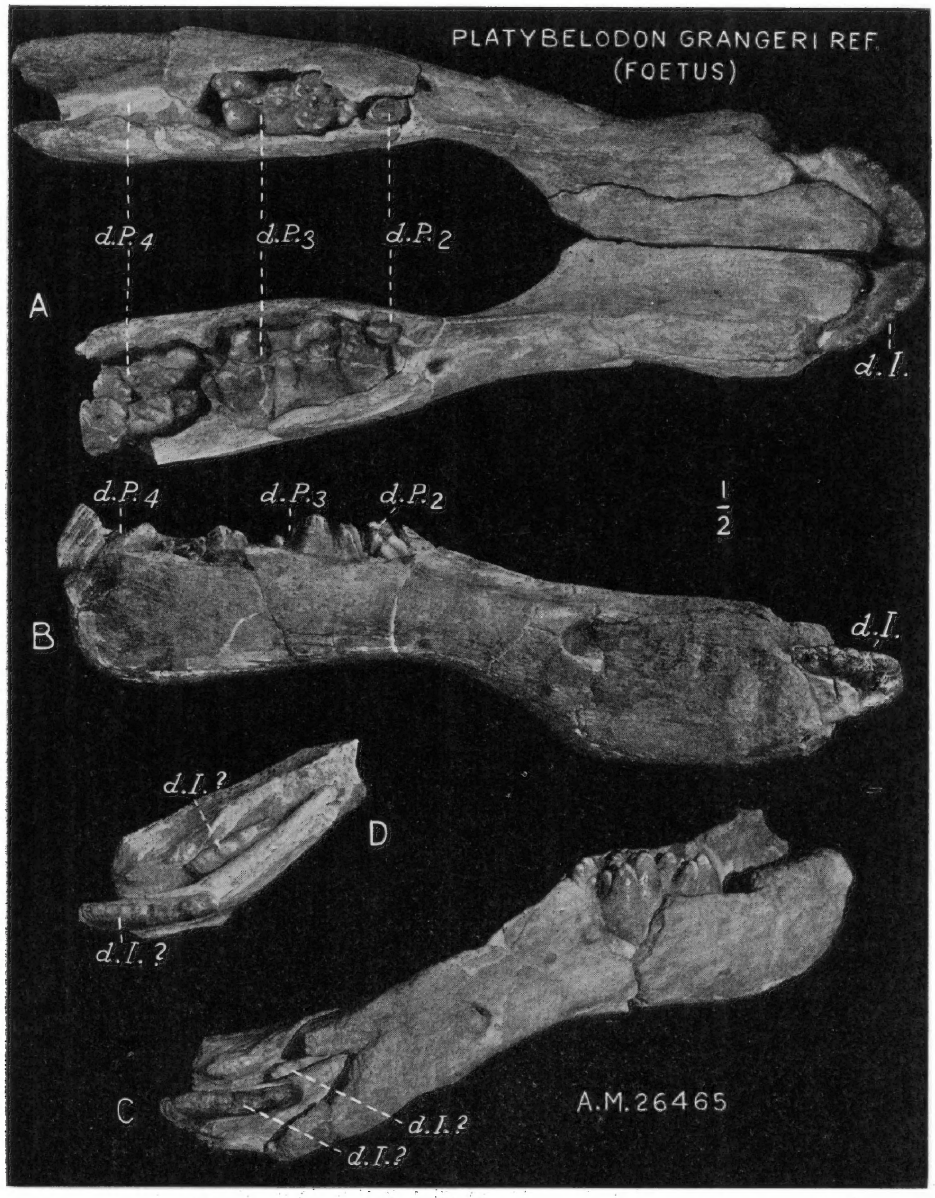

Fig. 2. Mandible and dentition of *Platybelodon grangeri* ref. (A. M. 26465). Quarry No. 2.

This very immature mandible is believed to be that of a foetus, as it was found within the pelvic bones of an adult. It contains the milk dentition, d.I to d.P_4 inclusive. A, crown view; B, outer view of right ramus; C, diagonal view of left ramus; D, view of left incisors with bone removed. One-half natural size.

most unusual feature of the 1930 collection is the series of specimens illustrating growth stages. These range from old adults down to very young or even fœtal specimens. A part of this material has already been prepared, and it is thought best to present at this time some of the more interesting of these specimens rather than wait for the final treatment of the entire collection.

FOETAL YOUNG.—(Figs. 2 and 3.) This specimen, consisting of a pair of lower jaws, a maxilla and a fragment of a premaxilla supporting the upper incisor, was found lying between the two halves of the pelvis of an adult *Platybelodon*, and this, coupled with the fact that none of the teeth is erupted, leads to the presumption that this was actually an unborn young. Some interesting characters are to be observed in this specimen which would be lost in an individual which had begun to use its teeth. Both upper and lower tusks are tipped with thin enamel which is indicated in the photographs

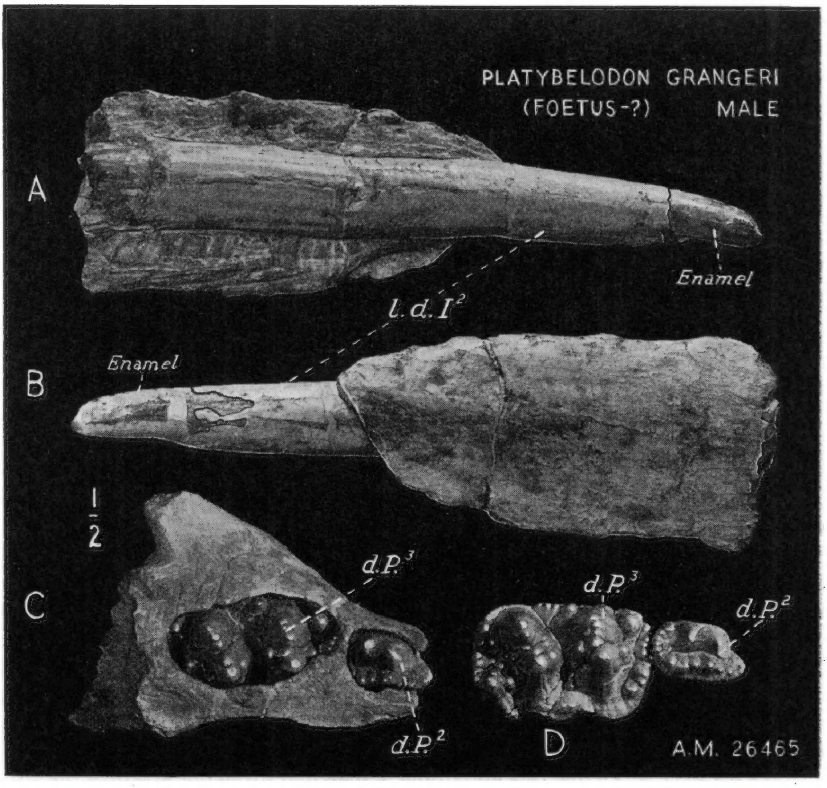

Fig. 3. Superior dentition of the same individual (A. M. 26465) as that represented in Fig. 2.

The teeth are identified as the superior milk incisor, A, inner, B, outer view; and premolars 2 and 3, C showing teeth in alveoli, D same teeth removed from alveoli. One-half natural size.

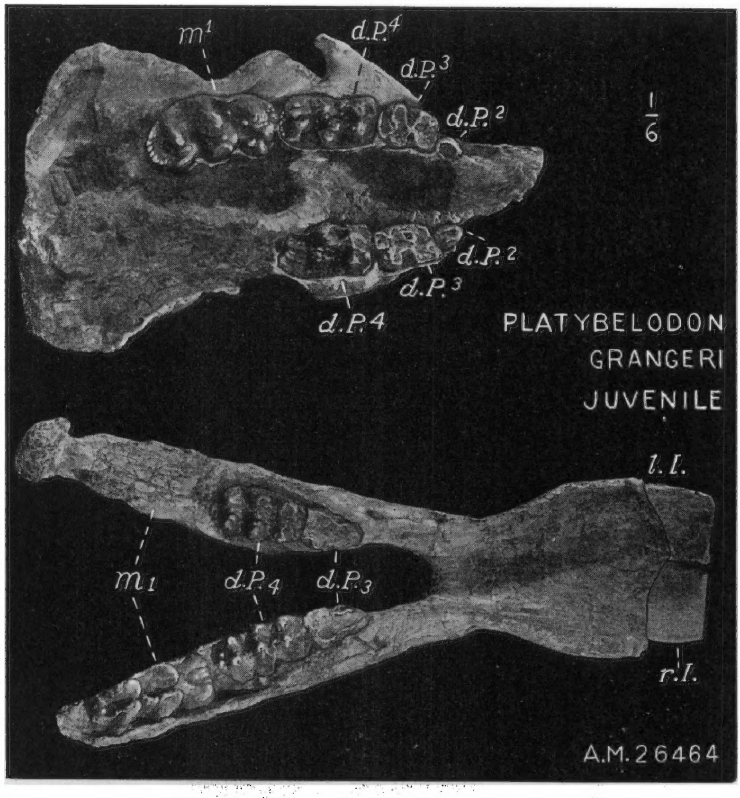

Fig. 4. Juvenile fragmentary cranium and nearly complete mandible of *Platybelodon grangeri* ref. (A. M. 26464). Quarry No. 2.

Containing the deciduous dentition and permanent M^1 and M_1 as indicated. The flattened incisors are indicated as R. I. and L. I. and for the present interpreted as being the tips of the large permanent incisors represented in the adult stage in Figure 5. One-sixth natural size.

by darker coloring. The lower incisors present a scalloped anterior edge not perfectly shown in Figure 2. The presence of two incisors, one lying directly above the other and less advanced in growth, is a bit puzzling. It is presumed that the lower and more advanced one is a deciduous tooth. The upper one, which has a crown of about the same size as the other, may be a second deciduous incisor or possibly the germ of the permanent tooth. The anterior cheek tooth, above and below, is definitely the second deciduous premolar, as determined by working backward from an adult through a series of young individuals; in the lower jaw this is a simple peg-shaped tooth and was apparently lost early in the life of the individual.

JUVENILE.—(Fig. 4.) In this individual, which had probably attained the age of two years or more, the permanent lower incisor is already functioning and shows the characteristic bevel on the anterior edge. The first molar, above and below, is formed but not erupted. The second premolar is still retained in the upper jaw but has already been discarded in the lower jaw.

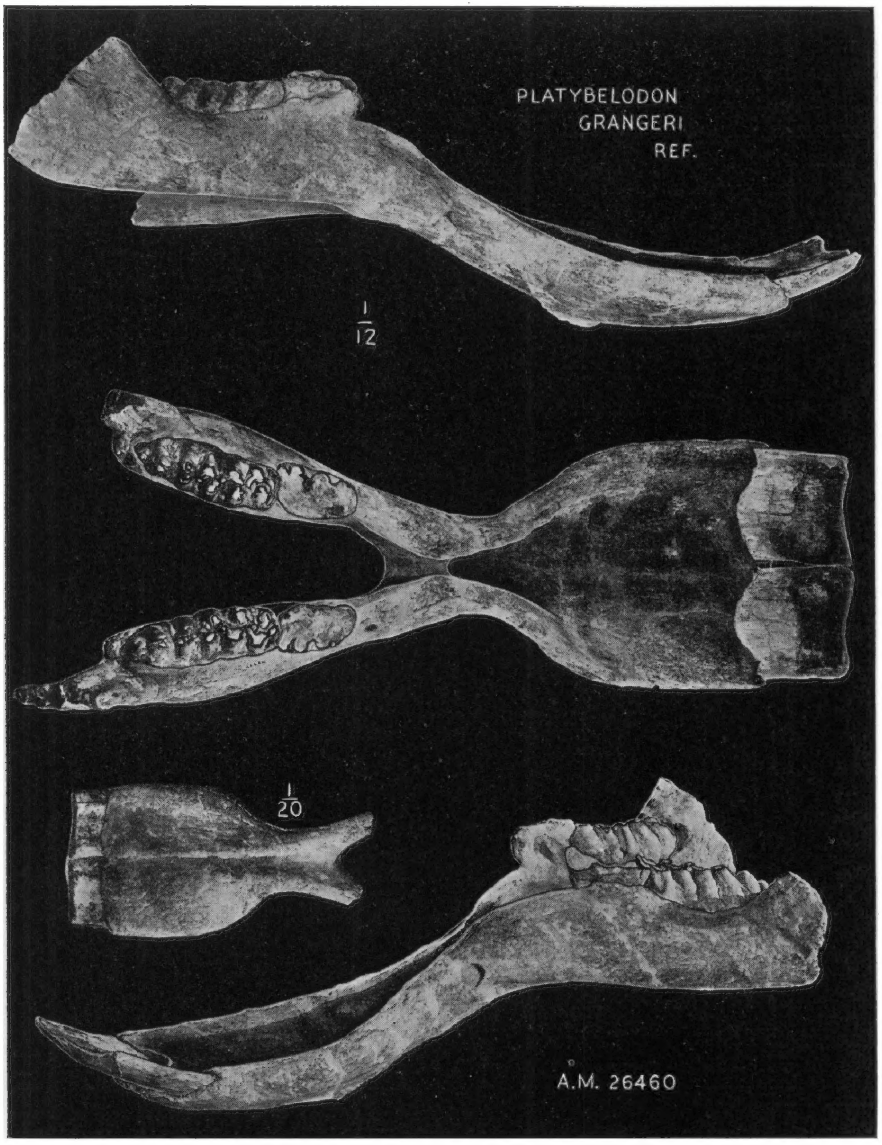

Fig. 5. Fully adult mandible and dentition of *Platybelodon grangeri* ref. (A. M. 26460). *Platybelodon* Quarry No. 1.

Superior and two lateral aspects, one-twelfth natural size. Inferior aspect of I_2 displaying the scissor-shaped lower surface, about one-twentieth natural size.

ADULT.—(Figs. 5 and 6.) The lower jaw of a fully adult animal with the M_3 in wear is uncrushed and exhibits in an admirable manner the profile of the ramus and the broad shovel-shaped symphyseal region. The bevel on the edges of the incisors is beautifully shown in this specimen. It seems probable that this bevel was produced by abrasion against a smooth rock or against the bottom of a shallow pond or stream in the process of scooping up vegetation, a process in which the broad short trunk was used in connection with the mandibular scoop.

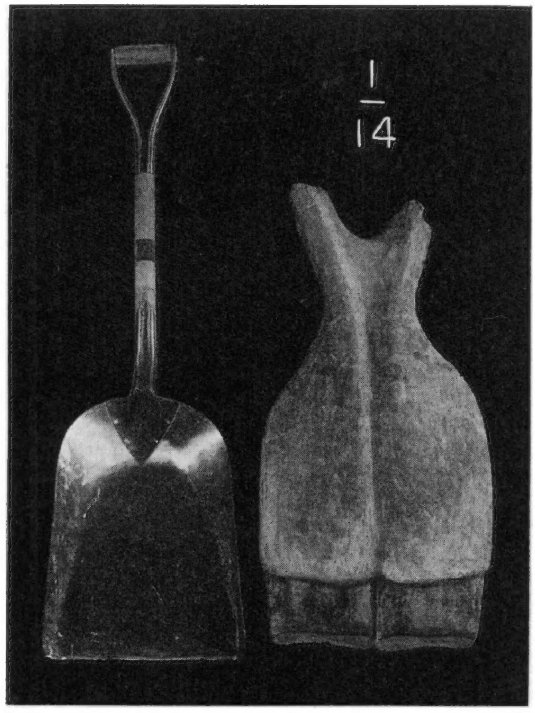

Fig. 6. *Platybelodon grangeri* ref. (A. M. 26460) anterior portion of the same mandible as in Fig. 5.

Inferior aspect of the lower pair of incisors, I_2, placed beside a coal shovel with the same transverse diameter of the anterior cutting portion of the inferior incisors, namely, fourteen inches. One-fourteenth natural size.

Platybelodon

INFERIOR CHEEK TEETH MEASUREMENTS[1]

	Foetus A.M. 26465	Juvenile A.M. 26464	Young A.M. 26201	Adult A.M. 26203
d. P_2 ap.	10 mm.			
tr.	6.5			
h.	9.5			
d. P_3 ap.	48	46 mm.		
tr.	32	32		
h.	26	?		
d. P_4 ap.		80		
tr.		39		
h.		35		
M_1 ap.		101	81+ mm.	
tr.		41	52	
h.		?	(Much worn)	
M_2 ap.			124	118 mm.
tr.			62	63
h.			50+	(worn)
M_3 ap.			not	211
tr.			fully	76
h.			formed	78 approx.

[1]A. M. 26201 and A. M. 26203 are from the 1928 collection.

Platybelodon

SUPERIOR CHEEK TEETH MEASUREMENTS

	Foetus A.M. 26465	Juvenile A.M. 26464	Young A.M. 26201	Old Adult A.M. 26462
d. P^2 ap.	25 mm.	23 mm.		
tr.	16	17		
h.	14	12+		
d. P^3 ap.	47	46		
tr.	30	34.5		
h.	24	20+		
d.P^4 ap.		75		
tr.		41		
h.		33		
M^1 ap.		101	115 mm.	
tr.		52 est.		
h.		50 est.		
M^2 ap.			imperfect	112+ mm.
tr.				70
h.				
M^3 ap.				184
tr.				?
h.				

Platybelodon

INFERIOR INCISOR MEASUREMENTS

	Foetus A.M. 26465	Juvenile A.M. 26464	Young A.M. 26201	Old Adult A.M. 26462
d. I_2 ap.	82 approx.		Incisors	
tr. (at cutting edge)	25.5		not preserved	
I_2 ap.		140 est.		400 est.
tr. (at cutting edge)		56		175

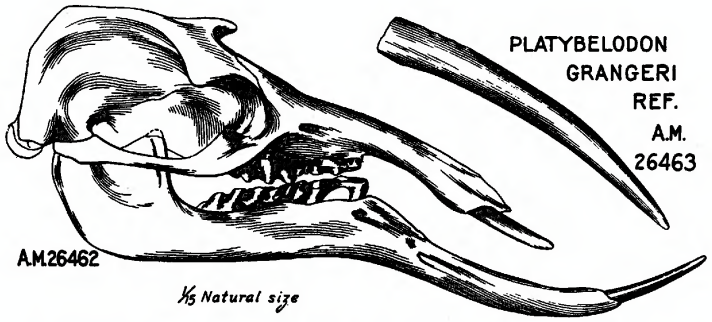

Fig. 7. *Platybelodon grangeri* ref. (A. M. 26462), an isolated specimen from the Tung Gur horizon, found with the cranium and jaws and parts of skeleton associated; a female. One-fifteenth natural size.

Male superior tusk of *Platybelodon grangeri* ref. (A. M. 26463) from *Platybelodon* Quarry No. 1. One-fifteenth natural size. Drawn to the same scale to show the marked disparity between the male and female tusks.

Serridentinus gobiensis, sp. nov.

TYPE.—A. M. 26461. A finely preserved right ramus of the lower jaw supporting M_{2-3} and with complete symphysis and both incisors.

HORIZON AND LOCALITY.—From the Tung Gur Lower Pliocene beds about 40 miles southeast of Iren Dabasu, Inner Mongolia. Found by R. C. Andrews, Central Asiatic Expedition, 1930.

SPECIFIC CHARACTERS.—Extreme length of ramus from tip of incisor tooth to posterior border = 109 cm. Extension of lower incisor beyond alveolar border = 12.5 cm. Greatest diameter of tusk at alveolar border = 5 cm. M_2 a-p. = 12.5 cm.; tr. = 8.5 cm. M_3 a-p. = 19.5 cm.; tr. = 8.7 cm. The lower border of the ramus, from the alveolar edge to the angle of the jaw, is a nearly straight line which is set off at an angle of about 15° from the plane of the molar crowns. Lower tusks rounded on the lower and outer surface and somewhat flattened on the lingual face. M_2 with three ridges, M_3 with four ridges and a heel. Serrated spur-crests or molar borders. Molar pattern extremely simple and lophodont.

Serridentinus gobiensis may be compared with three other species of the genus from Central Asia. From *Trilophodon* (*Serridentinus*) *inopinatus* Borissiak[1] it differs in its much greater size—the M_3 being about one-third longer—and in the presence of an extra half-loph on M_3. The rather highly elevated condyle and coronoid in the present species is a further distinction from Borissiak's form. From *S. mongoliensis* Osborn[2] from the Loh formation, and *S. florescens* Osborn[3] from the Kunuk

[1]Borissiak, A., and E. Belïaeva. 1928. *Trilophodon* (*Serridentinus?*) *inopinatus*, n. sp., from the Jilančik Beds of the Turgai Region. Bull. Acad. Sci., USSR, Cl. Sci. phys.-math., pp. 241–252, Pls. I, II.

[2]Osborn, H. F. 1924.630. *Serridentinus* and *Baluchitherium*, Loh Formation, Mongolia. Amer. Mus. Novitates, No. 148, Nov. 11, pp. 1–5, text figs. 1, 2, p. 1.

[3]Osborn, H. F., 1929.797. New Eurasiatic and American Proboscideans. Amer. Mus. Novitates, No. 393, Dec. 24, pp. 1–23, text figs. 1–22, p. 6.

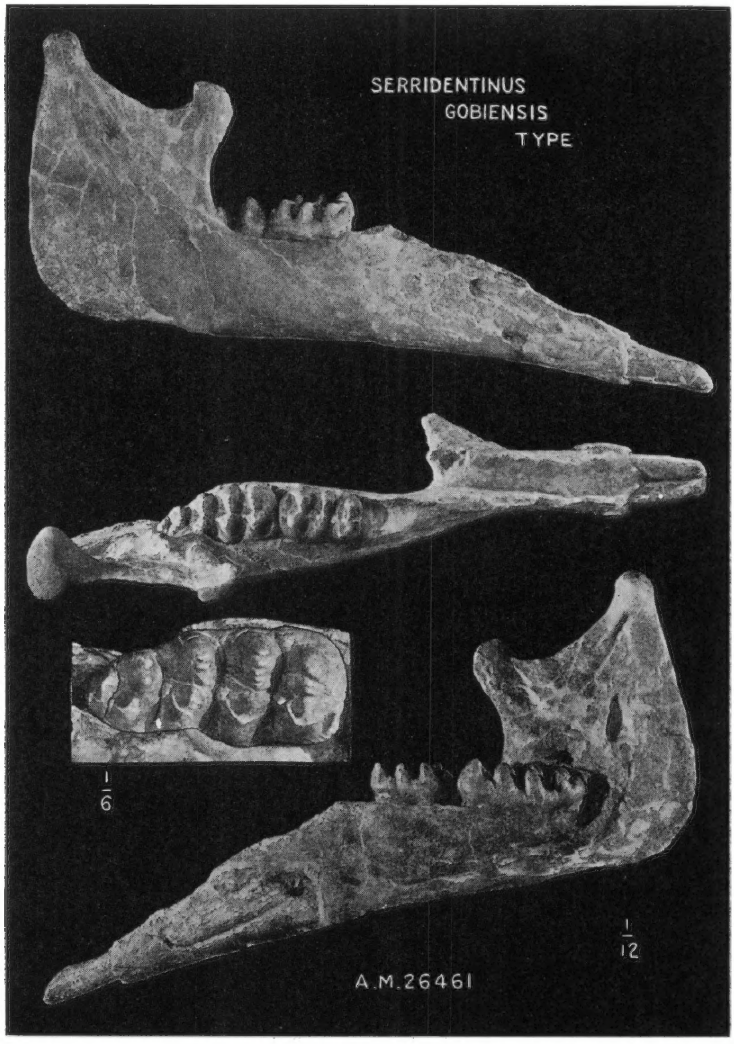

Fig. 8. Type of *Serridentinus gobiensis*, sp. nov. (A. M. 26461). From the Tung Gur formation.

An isolated adult specimen exhibiting the rod-like inferior incisors, the three-crested second inferior molar and a 4½rd-crested third inferior molar. Three aspects of the mandible after retouched photograph, one-twelfth natural size. Inset—retouched photograph of 4½rd-crested R.M_3 exhibiting the crescentic external spurs characteristic of the genus *Serridentinus*. One-sixth natural size.

beds, both of the western Gobi, this species is readily distinguishable by the simplicity of the molar pattern. *S. gobiensis* may be of approximately the same age as *S. mongoliensis*, but it is without much doubt older than *S. florescens*, which is not older than late Pliocene.

The fact that, aside from a few tooth fragments, this type jaw is the only mastodont, other than *Platybelodon*, found in the Tung Gur region would indicate that either it was a relatively very rare form or that its habitat was different. The latter theory seems the more probable. With few exceptions, *Platybelodon* has been found in direct association with quantities of fresh-water bivalves, suggesting that this region was at that time the shore-line of a lake of considerable extent. *Platybelodon*, with its broad flattened lower tusks, evidently found the region to its liking and very likely used its shovel-shaped jaw to scoop up succulent water plants. *Serridentinus*, on the other hand, with its small rounded tusks probably had quite different food habits and consequently a different range; it was an 'uproot tusker.'